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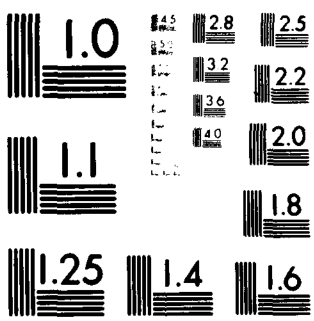

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FOREIGN TECHNOLOGY DIVISION

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ECONOMIC GAZETTE

(Selected Articles)

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*<u>ye</u> initially, after vowels, and after ъ, ь; <u>e</u> elsewhere. When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

FORGING AND PRESSING EQUIPMENT

An Observer

More than 140 enterprises, including 26 specialized enterprises, manufacture forging and pressing equipment in our country. The latter account for more than two-thirds of all forging and pressing machines. Production of these machines has risen from 26,200 units in 1958 to 33,800 in 1963. Production of automatics and forging machines has increased especially sharply.

The advantages of pressure metalworking over machining are indisputable. Economic calculations show that employment of the former method reduces metal waste 3-4 fold and frees a large number of metal-cutting machines. But this advanced technology is not yet being fully exploited. Production of precision billets by sheet-metal stamping and die forging, among other things, is being only slowly developed. Cold heading and extrusion are being employed to only a slight extent; these are the most productive and economic methods of producing billets by plastic deformation. At the same time, smith forging accounts for a large proportion (approximately 20 per cent) of production.

One of the reasons for this situation lies in the fact that there is still insufficient production of forging and pressing equipment, especially of the most advanced categories of this equipment. Moreover, while manufacture of forging and pressing machines in 1962 was up by 2800 units as compared with 1961 figures and totalled 33,300 units, production in 1963 showed only an insignificant increase--only 500 units.

The development of pressure metalworking is also being impeded by both the insufficiency and poor quality of press molds and dies. They are now being manufactured on an essentially decentralized basis. Many enterprises are manufacturing them themselves to meet their own requirements, but in a second-rate, slipshod manner, the product therefore being of low quality. The organization of centralized production of a greater proportion of press molds and dies should be accelerated. This will make it possible not only to increase the production of these items, but also to improve their quality and precision, and, consequently, to reduce machining allowances.

These problems should be resolved by Gosplan SSSR's machine-tool industry and industrial diamond division and the corresponding administration of Sovnarkhoz SSSR [Council of the National Economy of the USSR], as well as by the State Committee on Machine Building.

No little responsibility for our underdeveloped pressure metalworking capacity rests with the metallurgists. They are not providing machine builders with adequate supplies of the sized rolled metal required, among other things, for upsetting metal hardware and other articles. Machine builders are therefore ordering automatic upsetting equipment in only small quantities. All these factors have created a situation in which the capacities of enterprises manufacturing equipment for these purposes, the Chimkent Press and Automatic Equipment Plant for example, are being utilized to the extent of only approximately 30-40 per cent.

The metallurgical industry is not supplying cold-rolled strip or steel of increased plasticity in adequate quantities or of the required quality. This is also an obstacle to the application of advanced technology. The State Committee on Ferrous and Nonferrous Metallurgy evidently needs to establish more appropriate proportions in the product mix of the various types of rolled products.

Designers and production engineers in the machine-building industry have put forth insufficient efforts toward the development of parts which could be produced by the highly efficient periodic rolling method. A paradoxical double discrepancy is the result. On the one hand we are not making enough equipment for periodic rolling production; on the other we are not exploiting existing equipment

to its full capacity. Because of a lack of orders this equipment frequently stands idle in the Frezer and Dneprodzerzhinskiy plants, for example.

Insufficient use is being made of stamp-cast and stamp-welded components, to include rib-stiffened stampings. The highly efficient pulse stamping methods, which make it possible to produce high-precision billets with a great degree of deformation, are also only little used. In the meantime, however, they could be entirely replacing sheet-metal stamping and closed-impression die forging in the case of single-unit or small-series production.

Work on knurling pinions, splined shafts and feed screws, as well as on the liquid forging of steel parts, has not yet emerged from the experimental stage.

What trends in billet production by the plastic deformation method will we see in the immediate future? What development will forging and pressing equipment production undergo?

It is anticipated that production of this type of equipment will be 70 per cent higher in 1970 than in 1965. Production of machines performing the most advanced operations in the production of billets by the plastic deformation method will rise at especially rapid rates. We will see a simultaneous drop in hammer production.

Highly efficienct means of integrated mechanization and automation of forging and pressing operations will be developed. The productive capacity of the new equipment should be 3-4 times greater than that of existing equipment. Smith forging will evidently be retained only in repair shops, as well as in the production of single units and large forgings.

Production of pressing equipment for processing plastics will rise, primarily through increasing output of automatic thermoplastic machines. They will account for 35 per cent of the overall volume of production of this type of equipment, while output will rise more than 6 fold as compared with last year's production. Pressing parts from plastic will make it possible as early as next year for machine builders to save approximately 90,000 tons of lead, 180,000 tons of rolled ferrous metals, 100,000 tons of cast iron and 40,000 tons of nickel. This will also result in a saving of 130 million man-hours and 320 million rubles.

A higher degree of enterprise specialization will also contribute to all this. By 1970, specialized enterprises will be accounting for roughly 80 per cent of total production of forging and pressing equipment.

NEW BRANDS OF STEEL

A. Kablukovskiy
Administrative Head of the State Committee
on Ferrous and Nonferrous Metallurgy

Progress in present-day metallurgy would be unthinkable without the introduction of new brands of steel and improvement of the processes involved in its production. Consumers are imposing ever more stringent requirements upon metal quality.

High-strength, low-alloy steels are now competing successfully with the widely used carbon steels. Lighter weight machines and other equipment can be manufactured from these steels. They possess many advantages: they resist wear, can be deep-drawn, are easily welded, offer high resistance to flattening, etc.

While it costs more to produce low-alloy steels, they are more economically efficienct under these conditions than carbon steels. They cut the weight of structural components 12-25 per cent, for example, and their cost by roughly 12 per cent. It is especially economically advantageous to use this metal in concrete reinforcement. The cost of reinforcing metal is reduced 20 per cent in this instance. In tanks, trailers, pile drivers, drop hammers, earth-moving equipment, oil-field equipment, engine parts, the steel framework of buildings, bridges and ships--low-alloy metal has been proven to advantage everywhere.

Its sphere of applicability is very great, and the demand for it is continually increasing. This is why it is so important to intensify the research under way in our scientific research institutes and to achieve a substantial expansion in the nomenclature of advanced structural materials.

How sharply heat treatment improves the quality of rolled metal is generally known. It has made it possible to cut the weight of machines and other products 30-50 per cent. At the same time, our metallurgical plants dispose of no great heat-treating capacities,

while the construction of shops and sections is still lagging behind. Enterprises are therefore continuing to ship out rolled products of insufficient strength.

The thermomechanical method of treating steel is highly advanced. A number of scientific research institutes are studying the optimum conditions of this process. The introduction of this highly promising method into ferrous metallurgical production operations will make possible both substantial savings and great improvement in product quality.

The rapidly developing chemical industry stands in need of greater quantities of the new, high-quality steels and alloys. TsNIIChERMET [Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin] has developed a number of brands of this metal with an increased chrome and nickel content and molybdenum and copper additives. These steels and alloys are intended for use in the manufacture of structural components operating under adverse conditions associated with aggressive mediums such as sulfuric and fluosilicic acids and fluoride compounds. This is an excellent material for drip-round and spiral coolers, heat exchangers, pumps and other chemical apparatus. It increases the resistance of pipelines, for example, by roughly a factor of five. Plants are now setting up for the production of pipe, forgings, sheet and strip from similar steels.

Our electric power system requires transformers possessing high electrotechnical characteristics. The E320, E330 and E330A brands of cold-rolled textured steel 0.35 mm thick are the most suitable in this instance. The experience of the Uralelektroapparat plant shows that consumption of electrical steel in the manufacture of transformers can be cut 25 per cent, winding copper consumption 7.5 per cent.

If the Verkh-Isetskiy plant alone were to change over to production of cold-rolled steel instead of hot-rolled, it would make possible a saving in electrotechnical industry enterprises of approximately 50,000 tons of metal, as much as 2,000 tons of copper and great amounts of electric power in operating the equipment.

Hence the great importance of the task of improving the quality of transformer steel. The ways to accomplish it have been decided

upon. It is necessary, among other things, to accelerate construction of the new shops at the Verkh-Isetskiy, Cherepovetskiy and Zaporozhstal plants. The second phase of the cold-rolling shop at the Novolipetsk plant should be brought on line in the shortest possible period of time.

Much has yet to be accomplished in all our metallurgical plants in the way of improving production technology, tightening production discipline, modernization and replacing antiquated equipment. Some plants are shipping rolled plate and bar stock to consumers with inadequately finished surfaces. All-Union State Standards and technical specifications are not being adhered to. The Serovskiy combine, for example, is shipping out extra-hard ball-bearing steel "contaminated" with nonmetallic inclusions.

Enterprises are not thoroughly analyzing data on the effect of the quality of raw material, ferroalloys and other materials on the metal to be melted. Neither are the causes of defective production being carefully studied. In a number of instances, the system of computing bonuses and additions to pay provides no incentive to tighten production discipline.

Vacuum and electroslag metallurgy will undergo especially rapid development during the coming five years. The electroslag remelting method developed at the Institute of Electric Arc Welding imeni Paton of the Academy of Sciences of the UkSSR insures the production of metal with excellent characteristics.

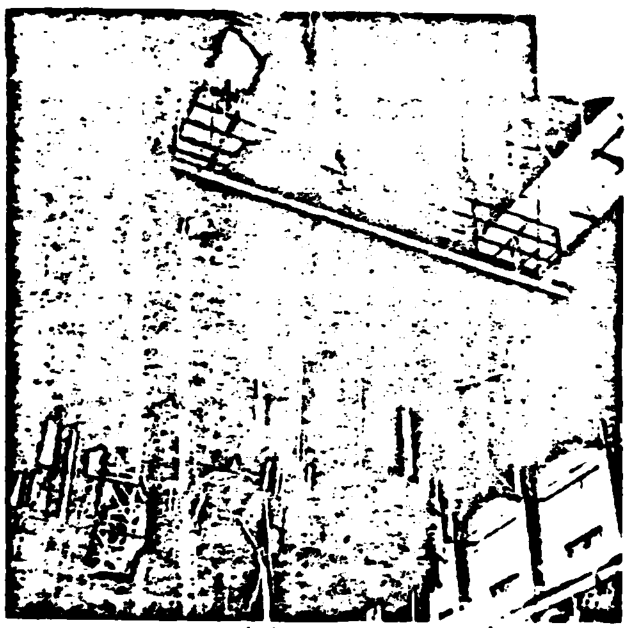
As bench tests have demonstrated, ball bearings made of electroslag remelted steel are many times stronger. Instruments manufactured not from conventional, but rather from vacuum, steel have a service life 3-5 time longer and their production costs are cut approximately in half. Expenditures incurred in equipping specialized vacuum and electroslag remelting shops are recouped in one and one-half to two years. The task of our scientific research institutes and enterprises is to develop and establish the conditions for these advanced production processes.

Vacuum treatment of molten steel in the ladle also has a bright future. This process reduces the content of gases in the metal 2-3 fold; it therefore produces purer metal and saves on the ferrosilicon

and aluminum used in deoxidation. A specialized organization is required to be responsible for designing, manufacturing and production testing steam-ejector pumps and vacuum chambers.

The new method of improving the quality of alloy and carbon steels developed by TsNIIChermet should also find extensive application. This procedure consists essentially in the fact that the metal is treated in the ladle with molten synthetic slag. It reduces sulfur content 5-6 fold and increases the plastic properties of the metal. Practical experience with refining metal using synthetic slag accumulated at the Chelyabinsk and Zlatoustovsk plants has made it possible to outline an extensive program introducing this method at many enterprises during the next five years.

During the period 1966-1970 metallurgy should see the greatest progress in the development of advanced production technology insuring the output of high-quality product.



The Dnepropetrovskiy press equipment plant manufactures high-power presses. In the photo: assembling a P-579 press for deep sheet-metal drawing.